International Journal of Applied Engineering Research 2015 vol.10 N24, pages 44867-44871

Polarization of radiation reflected from rough surface

Ziyatdinov R., Shabayev A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© Research India Publications. Surface roughness is one of the parameters characterizing machine components quality. One of shortcomings of the existing methods of surface quality control is impossibility of roughness measurement during part processing or low accuracy. It is known that roughness affects the polarization characteristics of reflected radiation. This is why one of the promising trends of development of surface quality control methods is application of polarization characteristics of reflected radiation. Theoretical investigation of this phenomenon is rather complex this is why by analysis of polarizing properties of a rough surface experimental methods shall be preferred. In order to achieve the tasks set experimental studies of impact of the surface roughness on polarization characteristics of reflected radiation have been performed. The results of the study demonstrate correlation between the roughness parameter Ra and degree of polarization of radiation reflected from the surface under investigation. Use of results of experimental studies allows designing the automated system of surface quality control during part processing, for example, by grinding. Use of such system will allow being alert of changes in the course of processing procedure, adjust cutting modes and, therefore, improve the component quality.

Keywords

Degree of radiation polarization, Polarization characteristics of reflected radiation, Surface roughness